Title (en)

Self-aspirating high-area-ratio interstage turbine duct assembly for use in a gas turbine engine

Title (de)

Selbstabsaugender Zwischenstufenkanal für eine Gasturbine

Title (fr)

Agencement de conduit inter-turbine auto-aspirant pour turbine à gaz

Publication

EP 1413713 A2 20040428 (EN)

Application

EP 03256698 A 20031023

Priority

US 27951402 A 20021024

Abstract (en)

In various embodiments, the present invention provides a means for improving gas turbine engine performance by applying fluid flow control to the inter-turbine duct (20) joining a high-pressure turbine spool (17) and an associated low-pressure turbine spool (15), allowing the low-pressure turbine spool (15) to have a relatively larger diameter than the high-pressure turbine spool (17). One or more unobstructed fluid flow paths (27) between one or more boundary layer suction ports (44) disposed within the upstream end (22) of the outer-body surface (32) of the inter-turbine duct (20) and the suction side of the associated low-pressure turbine nozzle (12) are provided. Advantageously, the natural static pressure difference between these points results in a self-aspirating assembly (10). The fluid flow control provided by the respective suction and blowing forces generated allows for a relatively larger diameter low-pressure turbine spool (15) and/or relatively fewer low-pressure turbine nozzles (12) to be used than is possible with conventional systems, assemblies, and methods. Thus, a gas turbine engine weight savings and optimized performance may be achieved.
An upstream end (22) and a downstream end (24) of a channel (40) are connected to a port (44) and disposed within a low-pressure turbine nozzle (12), respectively. The channel forms a bypass fluid flow path (27) between the nozzle and an inter-turbine duct (20) comprising an annular structure.
Independent claims are also included for the following: (1) gas turbine engine system; and (2) gas turbine engine performance optimization method.

IPC 1-7

F01D 9/02; F01D 9/06; F01D 5/18

IPC 8 full level

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